



Latex mediated hypersensitivity

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Introduction

Natural latex, a byproduct from the sap of a commercially grown rubber tree, *Hevea brasiliensis*, is an allergen in persons with considerable collective latex exposure. The sap contains at least 10 soluble proteins which can cause an IgE-mediated allergic/hypersensitivity reaction. Individuals at high risk are those in the rubber and health care industries, as well as others who undergo repeated surgeries, especially if they occur surgeries early in life. Persons with spina bifida, urogenital abnormalities, and specific food allergies are also considered a high risk population.

Latex rubber has been in use for over a century. Reports of immediate hypersensitivity to latex have increased dramatically since the first case was reported (in English) in 1979.¹ Sixteen deaths occurred in association with the use of a latex barium enema tip. This led to the recall of the device in 1991 by the U.S. Food and Drug Administration (FDA)² and an increase in awareness of the risk of a life-threatening type I allergy associated with natural latex devices. In the general population, 0.8% to 6.5% of persons are reported to be latex sensitive.³ This increases in persons having multiple surgical or urinary procedures; for example, as many as 73% of children with spina bifida are estimated to be latex sensitive.⁴

Since 1985, the establishment of "universal precautions" policies and the increased barrier requirements resulting from the epidemic of human immunodeficiency virus infection and acquired immunodeficiency syndrome have resulted in an exponential increase in the use of latex gloves. In 1987, 1 billion latex gloves were imported into the United States; in 1988, 8 billion gloves were imported.⁵

The importance of properly questioning our patients, recognizing early warning signs, and properly treating symptoms is paramount to the prevention of an anaphylactic reaction in our clinics.

Clinical implications

Possible sources of natural rubber latex in a dental practice include:

General:

- Gloves
- Rubber dam material and some wedges
- Local anesthetic cartridges
- Prophylaxis polishing cups
- Orthodontic elastics
- GA/sedation equipment including tubing, face masks, props
- Endodontic stops
- Amalgam carrier tips
- Adhesives and dressings, and their packaging
- Equipment and laboratory work previously handled with latex gloves
- Gutta percha
- Blood pressure monitor

What can happen as a result of a latex reaction?

There are three types of latex reactions:

Irritant contact dermatitis. The least threatening type of latex reaction, this nonallergenic reaction results in dryness, itching, burning, scaling, and lesions of the skin.

Allergic contact dermatitis. This is a delayed reaction to additives used in latex processing. This results in the same type of reactions as irritant contact dermatitis but the reaction is more severe, spreads to more parts of the body and lasts longer.

Immediate allergic reaction (latex hypersensitivity). This is the most serious reaction to latex. Symptoms include runny nose with hay fever-like symptoms, conjunctivitis (pink eye), cramps, hives and severe itching. Rarely, symptoms may progress to a life-threatening condition known as anaphylaxis -- which is associated with such symptoms as a sudden drop in blood pressure, an increased pulse, tremors, chest pain, difficulty breathing/wheezing, and tissue swelling. If left untreated, this condition could lead to temporary loss of consciousness and potentially death (rarely).⁵

Anaphylaxis presents with the clinical triad of:

1. Hypotension
2. Rash
3. Bronchospasm

NOTE: Hypotension is the most common sign. A rash is not always seen.

Diagnosis

Diagnosis is made initially by the patient history. If a positive history is elicited, refer the individual to an allergist or dermatologist for FDA-approved in vitro tests. Two of the tests used to measure latex-specific IgE are: Pharmacia CAP, Pharmacia-UpJohn Diagnostics Inc, Kalamazoo, MI and AlaSTAT, Diagnostic Products Corp., Los Angeles, CA.⁶ The low specificity of these tests (a false-negative rate of at least 20 percent and, thus, unclear positive predictive value) limits clinical usefulness. Negative serologic testing with a strongly positive history would suggest the value of skin prick testing to confirm the diagnosis.

It is clear that some latex allergens cross-react with plant-derived food allergens, the so-called latex-fruit syndrome, with evident clinical consequences. Foods most frequently involved are the banana, avocado, kiwi, and chestnut, although several others are also implicated. Investigations point to a group of defense-related plant proteins, class I chitinases, which cross-react with a major latex allergen, hevein, as the panallergens responsible for the syndrome.⁷

These previously mentioned foods have been responsible for anaphylactic reactions in latex-sensitive persons, while many other foods, including figs, apples, celery, melons, potatoes, papayas

and pitted fruits, such as cherries and peaches, have caused progressive symptoms beginning with oral itching.⁸ Persons with a history of reactions to these foods are at increased risk of developing latex allergy, and those who are sensitive to latex should avoid foods to which they have had previous reactions.

Treatment

There is no desensitization treatment; therefore the only true treatment is avoidance. Premedication with antihistamines, steroids and histamine H₂-blockers is sometimes carried out, but anaphylactic reactions have occurred despite such pre-treatment. In the case of an anaphylactic reaction the following drug protocol should be followed with epinephrine being your first line of action.

1. Epinephrine

- a. Relaxes smooth muscle, constricts blood vessels, and stimulates the heart.
- b. Use of EpiPen Autoinjector™ (0.3 mg/0.3 ml of 1:1000 epinephrine)
- c. Draw 0.3 ml from 1 ml ampule ("crash cart") and administer IV/IM/SC.

NOTE: The dose used initially for hypotension is not the same as in cardiovascular collapse or cardiac arrest. Large doses may ultimately be necessary, but starting with 1 mg epinephrine may cause life-threatening hypertension, myocardial ischemia and stroke.

2. Diphenhydramine (Benadryl)

- a. Block the binding of histamine to histamine receptors on target cells
- b. 0.5 - 1 mg/kg diphenhydramine (Benadryl)

3. Hydrocortisone or methylprednisolone

- a. Nasally administered are potent antiinflammatory agents
- b. 0.25 - 1 g hydrocortisone or 1 - 2 g methylprednisolone

4. Sodium cromolyn

- a. works by acting on certain inflammatory cells in the lungs to prevent them from releasing substances that cause asthma symptoms or bronchospasm.
- b. Adults and children 5 years of age or older—2 inhalations (puffs)

5. Aminophylline

- a. Prevent and treat wheezing, shortness of breath, and difficulty breathing caused by asthma, chronic bronchitis, emphysema, and other lung diseases. It relaxes and opens air passages in the lungs, making it easier to breathe.
- b. 5 - 6 mg/kg over 20 minutes for persistent bronchospasm

Dental management

The cornerstone of latex allergy treatment is avoidance. Since latex is an aeroallergen and present in the operating room air for at least an hour after the use of latex gloves, whenever

possible your patient should be scheduled as the first case of the day. At the time of appointment, latex allergy status should be established by the history or screening questionnaire. Status should be documented and prominently displayed on the front of and in the dental record, also at the door to the operating room. Emergency crash cart should be standing by and supplies should include nonlatex products. If blood pressure cuffs and tubing are made of latex, the patient's extremities should be wrapped to prevent contact. It has been recommended that medications not be drawn up through rubber-stoppered vials or allowed to sit in pre-loaded syringes that contain latex rubber. Persons with latex hypersensitivity should carry an epinephrine auto-injection kit and wear Medic-Alert identification.

Conclusion

Patients with natural rubber latex allergy have often been treated in a General Dental Practice without significant problems when adjustments have been made by the dental team to manage the patient's allergy. However, if the dentist is in doubt or lacks confidence, the patient may need to be referred for appropriate management, possibly in a hospital setting.

References

1. Nutter AF. Contact urticaria to rubber. *Br J Dermatol.* 1979 Nov;101(5):597-8.
2. Gelfand DW. Barium enemas, latex balloons, and anaphylactic reactions. *AJR Am J Roentgenol.* 1991 Jan;156(1):1-2.
3. Association of periOperative Registered Nurses, AORN Latex Guidelines, *AORN J.* 2004 Mar;79(3):653-72 .
4. K.K. Miller, Research based prevention strategies Management of latex allergy in the workplace, *AAOHN J.* 2000 Jun;48(6):278-90.
5. Kwittken P, Sweinberg S. Childhood latex allergy: an overview. *Am J Asthma Allergy Pediatr* 1992; 6:27-33.
6. The Cleveland Clinic Web site: <http://cms.clevelandclinic.org/ccfpulmonary/body.cfm?id=235>
7. Blanco, C. Latex-fruit syndrome. *Curr Allergy Asthma Rep.* 2003 Jan;3(1):47-53.
8. Beezhold DH, Sussman GL, Liss GM, Chang NS. Latex allergy can induce clinical reactions to specific foods. *Clin Exp Allergy.* 1996 Apr;26(4):416-22.
9. Kwittken PL, Becker J, Oyefara B, Danziger R, Pawlowski N, Sweinberg S. Latex hypersensitivity reactions despite prophylaxis. *Allergy Proc.* 1992 May-Jun;13(3):123-7.

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